

REMARKS

The present application was filed on February 22, 2002 with claims 1 through 26. Claims 1, 3, and 18-26 were cancelled in the Amendment and Response to Office Action dated April 13, 2007. Claims 2 and 4-17 are presently pending in the above-identified patent application. Claims 4, 16, and 17 are proposed to be amended herein.

In the Office Action, the Examiner objected to claim 2 due to an indicated informality, rejected claim 17 under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter, rejected claims 2 and 4-17 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement, rejected claims 2 and 4-17 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, and rejected claim 2 and 4-17 under 35 U.S.C. §103(a) as being unpatentable over Parida et al. (IDS document: Pattern Discovery on Character Sets and Real-valued Data: Linear Bound on Irredundant Motifs and an Efficient Polynomial Time Algorithm, presentation on The Eleventh ACM-SIAM Symposium on Discrete Algorithms (SODA), held on January 9-11, 2000. See "SODA 2000 program," printed from the internet at <http://www.siam.org/meetings/da00/> on 7/7/08).

The Examiner is thanked for the courtesy of a telephone interview on October 17, 2008, where the Examiner agreed to reconsider the section 103 rejection in view of the following argument. Applicants confirm the publication date cited above of the IDS document entitled "Pattern Discovery on Character Sets and Real-valued Data: Linear Bound on Irredundant Motifs and an Efficient Polynomial Time Algorithm." Applicants note that the IBM Technical Report requested by the Examiner is not available. Applicants submit herewith a copy of the paper requested by the Examiner entitled "An Approximation Algorithm for Alignment of Multiple Sequences Using Motif Discovery."

Formal Objections

Claim 2 was objected to because it is dependent from a following claim.

According to 37 CFR §1.126, the original numbering of the claims must be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered.

Thus, the current claim numbering complies with 37 CFR §1.126.

Section 101 Rejection

Claim 17 was rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. In particular, the Examiner notes that the claim is directed to a computer readable medium and asserts that, while the instant specification does not explicitly define the scope of the limitation of “computer readable medium,” one skilled in the art would understand that computer readable medium includes carrier wave, which is a signal.

Applicants note that claim 17 has been amended to require a computer readable *storage* medium.

Applicants submit that each of the claims are in full compliance with 35 U.S.C. §101. Accordingly, Applicants respectfully request that the rejection under 35 U.S.C. §101 be withdrawn.

Section 112, First Paragraph Rejection

Claims 2 and 4-17 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Regarding the amendment to claim 4 of “providing at least said at least one new motif as an output to a user, wherein said method is performed by a processor,” the Examiner acknowledges that the specification discloses that the method can be performed by a processor, but asserts that the specification does not adequately describe “providing at least said at least one new motif as an output to a user.”

Applicants note that the step of providing the new motif as an output to a user is an inherent step in the methods disclosed in the present specification. Moreover, the Examiner asserts that it would be obvious to one skilled in the art that the new motif generated by the algorithm is displayed or outputted to whoever uses the program, i.e. the user. (See, page 10 of the present Office Action.)

Thus, Applicants respectfully request that the rejection under 35 U.S.C. §112 be withdrawn.

Section 112, First Paragraph Rejection

Claims 2 and 4-17 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding the limitation “removing one or more selected motifs of the concatenated motifs and the first motifs” in claim 4, the Examiner asserts that the

metes and bounds of the limitation are not clear because, if one motif is selected to be removed, it is not clear how the one motif could be selected from “the concatenated motifs and the first motifs.”

Applicants note that claim 4 has been amended to require *removing one or more selected motifs, wherein said one or more selected motifs are any of the concatenated motifs and the first motifs.*

Regarding claim 4, the Examiner asserts that the metes and bounds of the limitation are not clear because it is unclear whether all the steps after the “removing suffix motif” step are actually steps of the sub-step of “removing suffix motif,” or steps in parallel with the step of “removing one or more selected motifs.”

Applicants note that claim 4 has been amended to indicate that the first three steps after the “removing suffix motif” step are actually steps of the sub-step of “removing suffix motif.” The “providing” step is not a sub-step of the “removing suffix motif” step; it is a step of the main method.

Regarding claim 4, the Examiner asserts that the metes and bounds of the limitation are not clear because it is unclear what is meant by augmenting the motifs.

Applicants note that the claims have been amended to change the term “augmenting” to the term “concatenating.”

Thus, Applicants respectfully request that the rejection under 35 U.S.C. §112 be withdrawn.

Independent Claims 4, 16 and 17

Independent Claims 4, 16 and 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Parida et al. In particular, the Examiner asserts that the algorithm disclosed in Parida is based on first detecting motifs or substrings of motifs, and then two agreeing motifs are concatenated to obtain a larger motif. At the end of each iteration, the set of budding motifs is trimmed so that they do not grow exponentially. The Examiner asserts that this trimming step is interpreted as being the same as the removing step of the instant claims. (Page 298 and the mathematical basis presented on pages 299-301.) The Examiner further asserts that the algorithm to detect and concatenate motifs is presented on pages 303-304.

Applicants note that the mathematical basis on pages 299-301 is an existential proof and is *not* a detection algorithm. The proof can be described as follows: For an input *s*, the footprints of all the overlapping maximal motifs (possibly exponential in number) are marked on *s*. The footprints of the redundant motifs are systematically trimmed, to expose only the irredundant and an amortization argument shows only a polynomial number of irredundant motifs. In the proof, there is *no* concern with how the motifs were discovered to begin with; the goal is merely bounding the number of irredundant motifs, for any input. Moreover, the cited paper does *not* disclose or suggest the concatenation steps recited in the independent claims. In particular, Parida does *not* disclose or suggest concatenating each of the plurality of first motifs with another of the plurality of first motifs to create a plurality of concatenated motifs; and concatenating motifs that have the same location list to create at least one new motif. Independent claims 4, 16, and 17, as amended, require concatenating each of the plurality of first motifs with another of the plurality of first motifs to create a plurality of concatenated motifs; removing one or more selected motifs, wherein said one or more selected motifs are any of the concatenated motifs and the first motifs, wherein the step of removing comprises removing suffix motifs, and wherein each motif in the concatenated motifs and the first motifs has an associated location list, and wherein the step of removing suffix motifs comprises the steps of: offsetting each location list for each of the motifs in the concatenated motifs and the first motifs to zero; checking each location list for each of the motifs in the concatenated motifs and the first motifs to determine location lists that are the same; and concatenating motifs that have the same location list to create at least one new motif.

Thus, Parida does not disclose or suggest concatenating each of the plurality of first motifs with another of the plurality of first motifs to create a plurality of concatenated motifs; removing one or more selected motifs, wherein said one or more selected motifs are any of the concatenated motifs and the first motifs, wherein the step of removing comprises removing suffix motifs, and wherein each motif in the concatenated motifs and the first motifs has an associated location list, and wherein the step of removing suffix motifs comprises the steps of: offsetting each location list for each of the motifs in the concatenated motifs and the first motifs to zero; checking each location list for each of the motifs in the concatenated motifs and the first motifs to determine location lists that are the same; and concatenating motifs that

have the same location list to create at least one new motif, as required by independent claims 4, 16, and 17, as amended.

Dependent Claims 2 and 5-15

Claims 2 and 5-15 are dependent on claim 1 and are therefore patentably distinguished over Parida et al. because of their dependency from amended independent claim 1 for the reasons set forth above, as well as other elements these claims add in combination to their base claim.

All of the pending claims, i.e., claims 2 and 4-17, are in condition for allowance and such favorable action is earnestly solicited.

If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this application, the Examiner is invited to contact the undersigned at the telephone number indicated below.

The Examiner's attention to this matter is appreciated.

Respectfully submitted,



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